


EXHIBIT C

US8203541	OnePlus 9 Pro (“The accused product”)
1. A display device for sensing the proximity of a touch, comprising:	<p data-bbox="485 233 1570 269">The accused product comprises a display device for sensing the proximity of a touch.</p> <p data-bbox="615 313 968 365">OnePlus 9 Pro</p>  <p data-bbox="485 1219 1818 1252">https://www.oneplus.com/9-pro/specs?_ga=2.75135643.80513312.1641875838-207069975.1637918088</p>



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Display

Parameters

Size: 6.7 inches (Measured diagonally from corner to corner.)

Resolution: 3216 X 1440 pixels 525 ppi

Aspect Ratio: 20:1:9

Type: 120 Hz Fluid AMOLED with LTPO

Support sRGB, Display P3, 10-bit Color Depth

Cover Glass: Corning® Gorilla® Glass

https://www.oneplus.com/9-pro/specs?_ga=2.75135643.80513312.1641875838-207069975.1637918088

Features

Hyper Touch

Reading Mode

Night Mode

Vibrant Color Effect Pro

Motion Graphics Smoothing

Ultra-high Video Resolution

Adaptive Display

https://www.oneplus.com/9-pro/specs?_ga=2.75135643.80513312.1641875838-207069975.1637918088

	<div data-bbox="493 224 877 256">OnePlus 9 OnePlus 9 Pro</div> <hr/> <div data-bbox="525 370 716 418"> <h2>Sensors</h2> </div> <div data-bbox="1113 370 1560 410"> <div>In-display Fingerprint Sensor</div> <ul style="list-style-type: none"> Accelerometer Electronic Compass Gyroscope Ambient Light Sensor Proximity Sensor Sensor Core Flick-detect Sensor Front RGB sensor Barometer </div> <div data-bbox="478 857 1822 889"> https://www.oneplus.com/9-pro/specs?_ga=2.75135643.80513312.1641875838-207069975.1637918088 </div>
<p>an organic light emitting diode (OLED) display comprising OLED materials forming a plurality of nodes configured to emit light when drive circuitry provides a signal across the plurality of nodes at or above an</p>	<p>The accused product comprises an organic light emitting diode (OLED) display comprising OLED materials forming a plurality of nodes configured to emit light when drive circuitry provides a signal across the plurality of nodes at or above an illumination threshold.</p>

illumination
threshold; and



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What is an OLED?

OLED (Organic Light Emitting Diodes) is a flat light emitting technology, made by placing a series of organic thin films between two conductors. When electrical current is applied, a bright light is emitted. OLEDs are emissive displays that do not require a backlight and so are thinner and more efficient than LCD displays (which do require a white backlight).

<https://www.oled-info.com/oled-introduction>

OLED technology requires a current control driving method

The OLED has electrical characteristics very similar to a standard light emitting diode (LED) where brightness depends on the LED current. To turn the OLED on and off and to control the OLED current a control circuit, thin film transistors (TFTs) are being used.

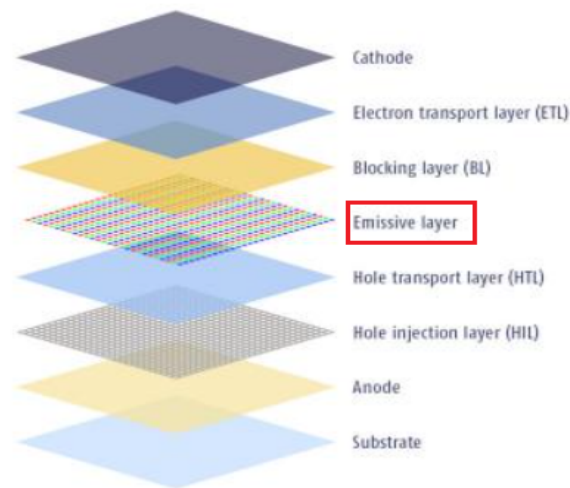
Backplane technology enables flexible displays

High-resolution color active matrix organic light emitting diode (AMOLED) displays require an active matrix backplane using an active switch to turn each pixel on and off. The liquid crystal (LC) display amorphous

<https://www.eeworldonline.com/blog/2009/10/oled-display-technology-and-capabilities>


How do OLEDs work?

The main component in an OLED display is the OLED emitter - an organic (carbon-based) material that emits light when electricity is applied. The basic structure of an OLED is an emissive layer sandwiched between a cathode (which injects electrons) and an anode (which removes electrons).



OLED device structure

<https://www.oled-info.com/oled-technology>

	<h2><u>LTPO backplane technology - introduction and news</u></h2> <p>Article last updated on: Dec 27, 2021</p> <p><u>Low-Temperature Polycrystalline Oxide, or LTPO, is an OLED display backplane technology developed by Apple. LTPO combines both LTPS TFTs and Oxide TFTs (IGZO, Indium Gallium Zinc Oxide). LTPO is applicable for both OLED and LCD displays, actually, but this backplane technology is likely to be used exclusively in high-end OLED displays</u></p> <p>https://www.oled-info.com/ltpo</p>
<p>measurement circuitry disposed proximate to the plurality of nodes, wherein the measurement circuitry is configured to sense the light reflected off of an object positioned over the OLED display and passed through the OLED materials, and wherein the measurement circuitry is further configured to provide a measurement signal responsive</p>	<p>The accused product comprises a measurement circuitry disposed proximate to the plurality of nodes, wherein the measurement circuitry is configured to sense the light reflected off of an object (e.g., fingerprint of the user) positioned over the OLED display and passed through the OLED materials, and wherein the measurement circuitry is further configured to provide a measurement signal responsive to the sensed reflected light.</p> <div data-bbox="487 849 711 904">  </div> <div data-bbox="1018 863 1751 891"> Store Phone Audio & Wearables Service Community </div> <div data-bbox="512 1050 651 1097"> <h3><u>Display</u></h3> </div> <div data-bbox="976 1049 1142 1081"> <h4>Parameters</h4> </div> <div data-bbox="976 1112 1688 1143"> <p>Size: 6.7 inches (Measured diagonally from corner to corner.)</p> </div> <div data-bbox="976 1149 1442 1182"> <p>Resolution: 3216 X 1440 pixels 525 ppi</p> </div> <div data-bbox="976 1188 1218 1221"> <p>Aspect Ratio: 20:1:9</p> </div> <div data-bbox="976 1227 1449 1260"> <p>Type: 120 Hz Fluid AMOLED with LTPO</p> </div> <div data-bbox="976 1266 1518 1299"> <p>Support sRGB, Display P3, 10-bit Color Depth</p> </div> <div data-bbox="976 1305 1421 1336"> <p>Cover Glass: Corning® Gorilla® Glass</p> </div> <p>https://www.oneplus.com/9-pro/specs?_ga=2.75135643.80513312.1641875838-207069975.1637918088</p>

to the sensed
reflected light.

OnePlus 9 | OnePlus 9 Pro

Sensors

In-display Fingerprint Sensor

Accelerometer
Electronic Compass
Gyroscope
Ambient Light Sensor
Proximity Sensor
Sensor Core
Flick-detect Sensor
Front RGB sensor
Barometer

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ONEPLUS 9 PRO PERFORMANCE AND OXYGENOS 11

Even though the camera is often the main differentiator for an Android phone, it's not necessarily everybody's highest priority. When I'm not pixel-peeping photos, the OnePlus 9 Pro is the best Android phone I've used so far this year. The performance is great. I'm especially impressed with the optical in-screen fingerprint sensor, which is super fast and doesn't seem to be thrown by weird lighting conditions.

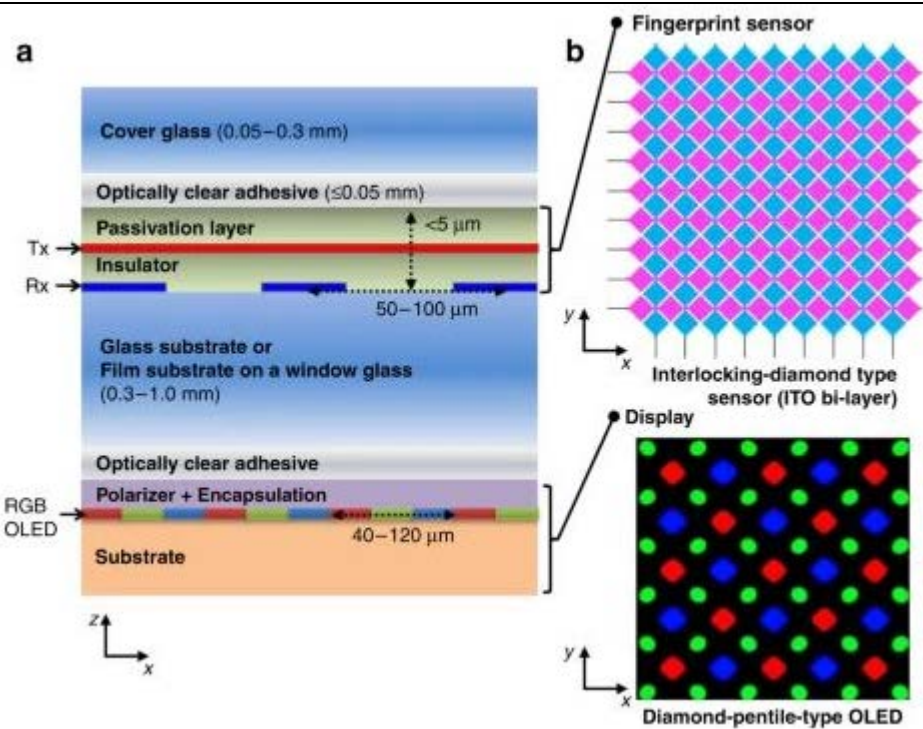
<https://www.theverge.com/22344840/oneplus-9-pro-review-price-camera-screen-specs>

A word on in-display scanners

Ultrasonic fingerprint scanners aren't the only option if you want to hide the sensor in the display. Optical-capacitive fingerprint scanners are being used for this purpose too. The industry is currently split between these two. However, you'll seldom find ultrasonic scanners at the more affordable end of the market.

Optical-capacitive scanners address some previous security issues with optical designs. They combine the "real touch" requirements of capacitive scanners with the speed and energy efficiency of optical designs. This technology is embedded by inserting a sensor under the display. It detects light reflected by a fingerprint back through the gaps in the OLED display. This requires some work to integrate with the display, but it works quite well.

<https://www.androidauthority.com/how-fingerprint-scanners-work-670934/>



<https://www.nature.com/articles/s41378-020-00203-4>

As soon as you place your finger on the sensor, an array of light-emitting diodes (LEDs) light up to illuminate the ridges and gaps and a CCD camera quickly captures an image of the same. The CCD system generates an inverted image of the finger, with darker areas representing more reflected light (the ridges of the finger) and lighter areas representing less reflected light (the valleys between the ridges). The image captured is then compared with the stored image.

The optical sensors are easy to fool as the technology used captures a 2D image and a good quality image can possibly breakthrough this security. It is worth noting that the technology works only with OLED displays, where there are gaps in the backplane. Initially, in-display fingerprint sensors weren't as reliable and fast as they are now. But things have changed in favour of these sensors in recent times.

<https://www.digitaltrends.com/mobile/synaptics-under-glass-clear-id-fingerprint-sensor/>

A scanning region is usually located beneath a certain section of the screen. When you place your finger over the scanner, a camera or other sensor captures a picture of your finger's pattern. It then compares it to your phone's biometric data. If it is a match, your phone will unlock it immediately.

<https://technozive.com/who-made-it-first-amoled-screen-notched-display-under-display-fingerprint-sensor/>